

Hitherto all methods have failed in one or other of these essentials. The report before us, however, contains a large body of accurate experimental evidence which goes to show that complete success can now be attained without risk to the workers and without damage to the material disinfected. The main feature of the process is a preliminary treatment in which material is submitted to the action of a warm solution of soap and water containing alkali, followed by squeezing through rollers. This causes softening and disintegration of any infected blood-clots, and the spores are laid bare for the subsequent destroying process, which is carried out by a warm solution of formic aldehyde. The material, after being again squeezed through rollers, is then dried and kept for a short time as an extra safeguard. According to the testimony of practical people the hair and wool are not injured by the process, and it is computed that ten million pounds of infected wool can be effectively disinfected for something less than 0.824 penny per pound weight.

The report is a brilliant instance of how preventive measures in medicine must be based on scientific inquiries, and it is not too much to expect that "wool-sorter's disease" may soon disappear from the list of the fatal maladies of man.

NOTES.

THE Bellahouston gold medal has been awarded by the University of Glasgow to Dr. R. T. Leiper, of the London School of Tropical Medicine, whose researches on Bilharzia disease in Egypt are well known.

THE David Syme research prize for 1918, consisting of a medal and 100*l.* for any scientific research in Australia during the last five years, has been awarded to Dr. T. Griffith Taylor for a thesis based on the correlation of Australian physiography, meteorology, and climatology, with special reference to the control of its settlement and industrial development.

MR. WILLIAM PERREN MAYCOCK, who died on June 29, was the author of many text-books and popular works on electrotechnics. Some of his works, as, for instance, his treatise on "Electric Lighting and Power Distribution," ran through many editions. Mr. Maycock took endless pains to present the subject clearly and correctly, and always welcomed criticism. He practised as a consulting engineer, and had been technical editor to the Westinghouse Companies' publishing department in Europe.

CANON RAWNSLEY, in a letter to the *Times* for June 28, stated that the War Office contemplated the draining of Wolmer Pond, near Liss, Hampshire, "in order to grow wheat on its sandy bottom." The pond is a natural feature of great interest, and it is closely associated with the natural history observation of Gilbert White of Selborne. We are glad to learn, therefore, in reply to an inquiry at the War Office, that it has been decided not to proceed with the draining of the pond. The Selborne Society has received the same intimation from the Secretary of State for War in reply to a petition submitted by the council of the society.

SIR J. J. THOMSON, Prof. W. H. Bragg, and Dr. W. Coolidge have been elected honorary members of the Röntgen Society. The following officers of the society have been elected for the ensuing year:—

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President: Dr. G. B. Batten. Vice-Presidents: Mr. J. Hall Edwards, Prof. A. W. Porter, and Dr. Dawson Turner. Members of Council: Mr. C. A. Clarke, Mr. N. S. Finzi, Mr. W. Hampson, Mr. C. Howard Head, Mr. C. R. C. Lyster, Dr. J. Metcalfe, Prof. J. W. Nicholson, Dr. G. H. Rodman, Mr. W. E. Schall, Mr. E. S. Worrall, Mr. E. P. Cumberbatch, and Dr. V. E. A. Pullen. Honorary Treasurer: Mr. Geoffrey Pearce. Honorary Secretaries: Dr. Robert Knox and Dr. Sidney Russ. Editor of the Journal: Mr. W. F. Higgins.

LORD HYLTON announced in the House of Lords on July 2 that it is proposed to recommend to the King that a Royal Commission should be appointed at an early date, consisting of members of both Houses of Parliament and other persons with special qualifications, to consider the question of the desirability or otherwise of making a change in our coinage system. The terms of reference will be to consider the proposal embodied in the Bill which was recently introduced by Lord Southwark in the House of Lords. The Commission, if it decides in favour of a change, may either adopt the proposals contained in the Bill or make any other proposals. It will be able to put forward its recommendations in the form of a draft Bill.

IN connection with the Food Economy (Plants) Exhibit at the Natural History Museum, South Kensington, an explanatory leaflet has been prepared giving an outline of the basal principles of nutrition and the characteristics of the common foodstuffs. The information is conveyed in simple terms now familiar to the general public, and should add greatly to the educational value of the exhibit. In a popular exposition of scientific knowledge on this subject it is impossible to avoid a certain degree of looseness of expression, which the physiologist or agricultural chemist might feel disposed to criticise. It is scarcely correct, for instance, to describe malt as "fermented barley." On the whole, however, the information is correct and in accordance with current scientific teaching, and in no case can it be described as actually misleading.

THE list of pensions granted during the year ended March 31, 1918, and payable under the provisions of the Civil List Act, includes the following names:—Mrs. Mann, in consideration of the valuable services of her late husband, Mr. R. F. Mann, to science and medicine in the development of radiography, in the course of which he received injuries which resulted in his death, 120*l.*; Mrs. Judd, in consideration of the services of her late husband, Prof. J. W. Judd, to geological science, 75*l.*; Mrs. Rippon, in consideration of the valuable services rendered by her late husband, Mr. R. F. H. Rippon, to natural history and science, 50*l.*; Miss Bertha Couch, in consideration of the scientific eminence of her late father, Dr. Jonathan Couch, naturalist, ichthyologist, and author, 40*l.*; Mrs. Vaughan, in consideration of the scientific eminence of her late husband, Dr. Arthur Vaughan, geologist, 40*l.*; Mrs. Coffey, in consideration of the value of the researches and writings of her late husband, Mr. George Coffey, curator of the Dublin Museum on Irish archæology, 30*l.*

A GROUP of botanists in the United States has arranged for the publication of a monthly journal of botanical abstracts, botany to be interpreted in its broadest sense. The prime purpose of *Botanical Abstracts* is to supply prompt citations and abstracts of all papers dealing with botanical subjects, wherever published, as soon as possible after they appear. The editor-in-chief is Dr. B. E. Livingston, Johns Hopkins

University, Baltimore, and there are fifteen associate editors in the United States for particular sections of botanical science. Sectional editors are being appointed for other countries, and Dr. Marie Stopes has accepted the British editorship in palæobotany for the new journal. Dr. Stopes will be glad if all British (including the Colonies and Dominions) authors of papers dealing with palæobotanical subjects will send her on publication the titles, volumes, and exact page and plate references of their publications, followed by reprints as soon as they are available. Work from January, 1918, is wanted at once. Address to Dr. Stopes at University College, London, W.C.1.

THE Norwegian North Polar Expedition under the leadership of Capt. Roald Amundsen was to leave Christiania last week, and is expected to be absent for about five years. According to the *Times*, the *Maud*, the vessel of the expedition, will call at Bergen and Tromsø, and will proceed thence to Novaya Zemlya. The Kara Sea will be crossed, and the *Maud* will call at Dickson Island, at the mouth of the River Yenesei, to take on board 225 gallons of oil. From the wireless station at Dickson Island the latest news of the expedition may be expected. Skirting the north coast of Asia, the *Maud* will turn northward on the east of the New Siberia Islands and enter the polar pack about September. In 1893 the *Fram* entered the pack west of the New Siberia Islands. Amundsen, by starting from further east, hopes to drift parallel to the *Fram* across the North Polar Basin, but further north. He does not expect to touch continental land during the drift of the *Maud*, although he believes in the existence of a considerable amount of land north-east of Alaska. There is little news so far of ice conditions in polar seas this year, but they were reported to be favourable in Spitsbergen waters in June, and it is hoped that the crossing of the Barents Sea will present no difficulties. July is an early month for navigation in the Kara Sea, and the *Maud* will doubtless encounter difficulties there, but Amundsen's early start is a wise choice, since August and September are good months for the navigation along the north coast of Asia.

WE learn from *Science* that President Wilson has issued a proclamation establishing three new national forests in the East United States—the White Mountain, in Maine and New Hampshire, the Shenandoah, in Virginia and West Virginia, and the Natural Bridge, in Virginia. Proclaiming the forests is the final step in carrying out the law for building up eastern national forests through the purchase of lands in the mountains. The Pisgah National Forest, in North Carolina, and the Alabama National Forest, in Alabama, are the only eastern areas which had received this status before the new proclamations were issued. The White Mountain National Forest is located in Grafton, Carroll, and Coos Counties, N.H., and Oxford County, Me. There is now a total of about 391,000 acres under Federal protection. This forest protects in part the watersheds of the Androscoggin, Saco, Connecticut, and Ammonoosuc rivers. The Shenandoah National Forest is situated in Rockingham, Augusta, Bath, and Highland Counties, Va., and Pendleton County, W. Va. Here there is a total of approximately 165,000 acres under Federal protection. The forest is for the most part on the watershed of the Shenandoah River, and it also protects a portion of the watersheds of the Potomac and the James. The Natural Bridge National Forest of 102,000 acres is situated in Rockingham, Nelson, Amherst, Botetourt, and Bedford Counties, Va. The

forest, which protects a portion of the watershed of the James River, does not include the Natural Bridge, but this scenic feature is within three or four miles of the boundary.

WITH the double object of encouraging the Irish agriculturist to greater effort, and of making the facts better known in Great Britain, the Department of Agriculture and Technical Instruction for Ireland has issued a short leaflet giving a concise exposition of the part played by Ireland as a food supplier of Great Britain. For many years prior to the war the supply of food from Ireland to Great Britain steadily increased, until by 1913 it was exceeded only by that from the United States. Since the war the Irish supply has continued to increase, and, taking into account quantity, character, and proximity, must now be regarded as our most important supply. Comparison of the exports of foodstuffs from Ireland to Great Britain for the years 1912-13 and 1916-17 shows a decrease only in pig-products, dairy produce, and poultry, all items which have been detrimentally affected by the reduction of the import into Ireland of feeding-stuffs from abroad. The export of livestock to Great Britain has been more than maintained despite this reduction of imported feeding-stuffs and the breaking up of extensive areas of grass; while, in addition, Ireland has supplied very large quantities of potatoes, oats, hay, and straw to Great Britain and to the Army. Ireland produces 40 per cent. of the cattle and 30 per cent. of the pigs of the United Kingdom. She consumes only one-fourth of her own cattle. She is thus, in an increasing degree, Great Britain's nearest and greatest food base. An explanation is given of the meaning of certain Orders regulating exports from Ireland which have aroused adverse comment in Great Britain. It is maintained that these Orders were designed for the common interest of the United Kingdom, and were necessary to secure that the best possible use should be made of Irish resources.

WE regret to announce the death, after a long illness, of Prof. K. Toyama, professor of zoology in the University of Tokyo. Born in 1867, Prof. Toyama graduated from the College of Agriculture, Tokyo University, in 1892. After graduation he devoted himself to the study of the silkworm, the foundation of a most important Japanese industry. His earlier work dealt chiefly with the spermatogenesis and embryology of these insects, though he also published papers on their habits and the parasites attacking them. With the re-discovery of Mendel's work he commenced a series of experiments designed to elucidate the various characters distinctive of different breeds. During the progress of this research he spent several years working in the laboratory of the Royal Siamese Sericultural Department in Bangkok. The first instalment of his results appeared as a long and important paper in 1906—a paper which was the first of a series devoted to the unravelling of the genetic constitution of the various races of the silkworm. Later on he succeeded in clearing up the apparent inconsistencies in the hereditary behaviour of white and yellow colour in the silk which had puzzled other observers. He was able to prove the existence of two different kinds of white, one dominant and the other recessive to colour, a point of scientific interest as well as of considerable practical importance. One of his last pieces of work was the elucidation of certain peculiar phenomena in the transmission of egg-colours in the silkworm, and he was able to show that these are comparable with those observed in connection with the seed characters of many plants. To zoologists, perhaps, his name is best known in association with some

remarkable gynandromorphs of the silkworm and moth which were bred and described by him, for, owing to their important bearing on the problem of sex-determination, they at once received recognition as classical cases.

AN interesting account of the luminous moss *Schistostega osmundacea*, Mohr, is given by Mr. G. T. Harris in the *Journal of the Quekett Microscopical Club* (vol. xiii., April, 1918). The luminosity is due to certain cells of the protonema, which, as pointed out by Noll in 1887, are so constructed that the light rays falling upon them are refracted through the transparent sap and concentrated upon the chlorophyll grains which are grouped at the base of the cell. Owing to the shape of the cell, the light rays are totally internally reflected from the basal walls and again emitted, which gives the luminous appearance. The moss appears to be widely distributed in the British Isles. It seems to prefer a habitat with a northerly aspect, and apparently thrives best in granitic areas. The light-cells are differentiated on the protonema, and are spread out in an irregular superficial layer over the underlying protonemal filaments, which are bipinnately branched. The fruit is somewhat rare, but when it occurs it may be abundant. The distribution of the plant is aided by the deciduous spore-capsules and by an abundance of gemmæ formed on the protonema, especially when barren conditions of the plant prevail.

RESEARCHES carried out by Dr. Lewis H. Weed in the anatomical laboratory of the Johns Hopkins University have thrown a flood of light on the origin and nature of the fluid system which surrounds the central nervous system of vertebrate animals. Dr. Weed was successful in replacing the cerebro-spinal fluid in living pig embryos by a ferrocyanide solution, and was thus able by the deposition of Prussian blue to discover a series of unknown stages in the elaboration of the space in which this fluid is contained. In the first month of development, up to the stage in which the pig embryo has attained a trunk-length of 14 mm., the cerebro-spinal fluid is confined to the central canal of the nervous system. At that stage of development the roof of the fourth ventricle of the brain becomes thin and membranous; chorioid villi for the secretion of the fluid become developed, and fluid begins to appear in the tissue spaces outside the roof of the fourth ventricle. That accumulation over the roof of the fourth ventricle represents the first stage in the development of the sub-arachnoid spaces. From the roof of the fourth ventricle the sub-arachnoid system gradually spreads out, and by the time the pig embryo has attained a trunk-length of 26 mm. the system has reached the limits of the extensive ramifications to be seen in the adult animal, in which the spaces surround both spinal cord and brain. It is thus clear that the sub-arachnoid spaces are not parts of the lymph system, but are extensions of a special system developed as extensions of the central canal of the nerve axis. The aqueous chamber of the eye and perilymphatic spaces of the inner ear are systems of a similar kind. Dr. Weed was successful in finding further and convincing evidence of the secretion of cerebro-spinal fluid by the chorioid plexuses and of its absorption into the great venous sinuses of the dura mater by a special mechanism, represented in the adult by the Pacchionian villi. Much still remains to be done before the exact uses of the cerebro-spinal fluid are determined. Dr. Weed's researches have been published in full by the Carnegie Institution of Washington (*Contributions to Embryology*, vol. v., No. 14, 1917).

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IN Bulletin No. 28, entitled "The Soil Solution Obtained by the Oil-pressure Method," issued by the Michigan Agricultural Experiment Station, it is pointed out that the study of the liquid phase of the soil might yield much valuable information as regards soil fertility if a satisfactory method of obtaining a representative sample could be devised. An oil-pressure method is recommended, in which paraffin oil is forced through the soil enclosed in cylinders, thus displacing the soil solution. The physical and chemical properties of successive portions extracted from a given soil were found to vary very little, the greatest variation occurring in the nitrogen compounds, especially in the ammoniacal and nitrate nitrogen; the total nitrogen, however, did not change. From different soils the extracts differed; soil treatment and reaction cause considerable variation in potassium, calcium, magnesium, and especially nitrogen; phosphoric acid varies only slightly.

At the present time the use of electric furnaces is spreading rapidly in this country. In view of their further possibilities, the need for researches on the production and application of high temperatures is urged by Mr. C. R. Darling in an article contributed to the *Journal of the Society of Chemical Industry* for May 31. To emphasise the point as regards electric furnace research, the writer notes what has already been achieved by its use in transforming certain common materials. Coke and lime give calcium carbide, which in turn yields acetylene and cyanamide. Coke and sand give carborundum, an abrasive now used throughout the world; and the fusion of bauxite gives another abrasive, alundum, which has practically superseded other materials for the grinding of steel. Amorphous carbon yields graphite, which is now invaluable in electrolytic processes, and has proved to be the best material for filling dry voltaic cells. These products have revolutionised many industries, but they represent only the beginning. Investigations are needed, for example, on the conditions under which tungsten could be melted on a reasonably large scale, and valuable results might be expected from a study of the possible alloys obtainable from tungsten, tantalum, and molybdenum. Research work of the character required is being carried out in America, but practically nothing has been done in this country, though a start is being made at Sheffield University by the erection of an electric furnace for experiments on steel. The practicability of producing high temperatures by the combustion of gases under pressure is also a matter for investigation; Sir Robert Hadfield has recently directed attention to some early experiments of Bessemer in this direction.

IN the Metropolitan Museum of Art, New York, is the tomb of Perneb, originally erected at Memphis about 2650 B.C. Mr. M. Toch has had an opportunity of analysing the pigments used on the tomb, and gives an interesting account of them in a paper quoted by the *Chemical News* of June 7. The pigments are red, yellow, blue, green, grey, and black. The usual idea that the red used by the Egyptians was red ochre appears to be erroneous; the red found in this instance proved to be hæmatite, which contains much more iron oxide than the ochres. All the yellows used on the tomb were composed of the native ochre, which is clay coloured with iron-rust. The Egyptian blues are beautiful colours, ranging from a light sky-blue to a dark ultramarine. A microscopical examination of the dark blue showed it to be of the nature of a powdered "smalt" glass or porcelain; this powder has been rubbed into the pigmented surface and allowed to set with Nile clay or mud, which, being slightly alkali-

line, acts as a cement, and has both setting and binding properties. A greenish-blue pigment examined was composed of azurite, a hydrated carbonate of copper; whilst the green pigment was a mixture of malachite, azurite, and clay. The grey was limestone mixed with charcoal or carbon, and the black was a carbon black, composed of charred wood or burnt bones. It has been generally assumed that the Egyptians used white of egg as a binder for their pigments, but Mr. Toch could find no trace of any albuminous binder in the specimens submitted to him; they did, however, show evidence of the use of glue or gelatin. The pigment in two paint-pots, evidently thrown away by the workmen, was found to be hæmatite mixed with limestone and clay.

A REPORT of Prof. W. J. Pope's recent presidential address to the Chemical Society, which is comparable in importance with the late Prof. Meldola's address of eleven years ago, is printed in the April issue of the society's Journal. Prof. Pope commences his address—entitled "The Future of Pure and Applied Chemistry"—by pointing out that the last three years have dissipated for ever the fallacy that British chemists cannot excel in applied organic chemistry. In fact, Great Britain, which in 1914 had no resources for their manufacture, is now a larger producer of explosive, pharmaceutical, photographic, and other essential chemicals than Germany. The fact that science is unavailing has prevented the people from realising that the discoveries of Young, Davy, and Dalton at the beginning of the nineteenth century had more influence than the Napoleonic wars. The whole history of Europe for the last century was made within the laboratories of the Royal Institution. The greatest incentive to political change is the desire to increase the amenities of life, and research in pure science has for a hundred years been the greatest influence in this direction. Prof. Pope strongly urges that the various chemical societies should set up a joint council for the consideration of national questions in which chemical interests are concerned, and suggests for its consideration the correlation of the dye interests with the synthesis of pharmaceutical and photographic products, the development of natural colouring matters, and the study of patent law.

SOME interesting examples of the work accomplished by the Salvage Section of the Admiralty are given in *Engineering* for June 21. Since October, 1915, down to the present time about four hundred ships have been salvaged by this department. A large proportion of these ships, some of which are of high carrying capacity, has been repaired, refitted, and put in commission afresh. On account of the comparative shortage of shipping it is worth while at the present time to salvage practically every sunken ship, whereas before the war many would have been left to their fate on account of the cost of the operation exceeding the value of the ship. One of the great aids to salvage operations is the submersible electric-driven motor-pump, some types of which can deliver 500 tons of water per hour to a height of 75 ft. to 80 ft. One of the examples quoted is that of a vessel carrying a cargo of foodstuffs to the combined value of more than 3,000,000l. After being torpedoed, she was taken in tow by the Section's tugboats, but sank before she could be left high up on the beach. Electrically driven submersible pumps were put down in the stokeholds and divers established communication between the flooded holds and the stokeholds. After making the parts thus involved watertight on the outside the pumps were started, and the vessel, being thus lightened, could be drawn higher up on the beach, when similar operations were effected in the

lower submerged quarters. The vessel was ultimately floated off and repaired.

IN a recent issue of the *Zeitschrift für angewandte Chemie* is described a process (patented in Germany) for spraying metals on to any kind of surface, using metal melted in an electric arc and blown by means of gas-jets on to the surface to be covered. The metal to be sprayed forms one of the electrodes of the arc, and the gas-jets are directed so as to strike the sides of the metal electrodes without impinging on the arc and blowing it out. If the arc is produced between two electrodes, one being metallic, and a stream of non-oxidisable gas is directed on to the electrode, portions of the electrode that are melted will be carried away in the form of a fine spray, and may be deposited on any surface on which they impinge, thus forming a metallic skin on it. Suitable control apparatus is provided to allow for the wear of the electrodes.

WE have received a Classified List of Publications of the Carnegie Institution of Washington, dated December, 1917. It is stated that copies of each publication, except the *Index Medicus*, are sent gratuitously to each of the greater libraries of the world, while the remainder of the edition is to be sold at prices sufficient only to cover the cost of publication and postage. Among the volumes published by the institution in 1916 and 1917 we notice:—In astronomy, a revision of Ulugh Beg's Persian Catalogue of Stars by E. B. Knobel; in mathematics, a Sylow Factor Table of the first twelve thousand numbers by H. W. Stager; in chemistry, "The Interferometry of Reversed and Non-reversed Spectra," by Carl Barus; in terrestrial magnetism, "Ocean Magnetic Observations, 1905-16," by L. A. Bauer; in palæontology, "American Fossil Cycads," by G. R. Wieland, and "The Coal Measures Amphibia of North America," by Roy L. Moodie; in embryology, two new volumes of the "Contributions to Embryology," by various authors; in evolution, "Studies of Inheritance in Guinea-pigs and Rats," by W. E. Castle and S. G. Wright, "Gonadectomy in Relation to the Secondary Sexual Characters of some Domestic Birds," by H. D. Goodale, and "Sex-linked Inheritance in *Drosophila*," by T. H. Morgan and C. B. Bridges; in botany, "Plant Succession," by F. E. Clements; and in zoology, a new volume of papers from the Department of Marine Biology of the Carnegie Institution. It will be seen that the works recently published by the institution belong, as in former years, to many different branches of science. The complete list contains about 264 volumes published since 1903, with short descriptive notes on most of these publications.

MESSRS. BLACKIE AND SON, LTD., will shortly publish "Medicinal Herbs and Poisonous Plants," by Prof. David Ellis, of the Royal Technical College, Glasgow.

OUR ASTRONOMICAL COLUMN.

A NEW ASTEROID OF THE TROJAN GROUP.—A fifth member of this group has been discovered by Wolf. It has at present only the provisional designation CQ. The following elements are given in *Ast. Nach.*, No. 4945:—Epoch 1917, September 24.5, G.M.T., $M\ 83^{\circ}\ 18'\ 55''$, $\omega\ 329^{\circ}\ 32'\ 38''$, $\Omega\ 300^{\circ}\ 41'\ 27''$, $i\ 8^{\circ}\ 51'\ 26''$, $\phi\ 6^{\circ}\ 46'\ 53''$, $\mu\ 294.427''$, $\log a\ 0.720686$. CQ and Patroclus are about 60° behind Jupiter in longitude, while Achilles, Hector, and Nestor are 60° in front of Jupiter. The value of μ for each of them oscillates about $5''$ on each side of the value for Jupiter $299''$, the period of an oscillation being